The area within which this earthquake was most perceptible is tolerably well defined by that of the geological features here described. It is rudely elliptical in shape, about fifteen or twenty miles along the longer, and from five to seven across the shorter axis. Outside these limits, the shock, though in some places distinctly felt, seems to have rapidly lost force, so that at Linlithgow, about ten miles away, it was hardly perceptible. The effects by which the passage of the seismic wave made itself sensible were of the usual kind. For the most part all that was noticed was a tremor or quivering movement of the ground or houses, accompanied with the rattling of any loose objects. I was myself awake, and about to rise, when I was aware of a peculiar grinding noise and the jangling of all the crockery and glasses on the wash-hand-stand. It seemed as if some heavy load had been discharged from a waggon on the ground immediately outside the house. But as the position of the house on the outskirts of the southern suburbs of the city made this impossible, I was at a loss to conjecture the cause of the disturbance. I thought of an earthquake, but found that no other inmate of the house had noticed anything peculiar. In the course of the day, however, accounts came from all parts of the district affected, which put the real nature of the event beyond any doubt. The undulation of the ground was experienced by many observers, and the general impression was that the wave moved from west to east, or from south-west to north-east. Some who were not yet astir felt first one end of the bed and then the other depressed and raised. To others who were already on foot the ground seemed to sink away from their feet and to rise upward again. Chairs appeared to slide forward and backward. Pictures, lamps, and other hanging objects were set swinging. In one recorded case, an eight-day clock, which had been standing at the time, and of which the pendulum swings in an east and west line, was made to go. On the other hand, the parish clock of Currie was stopped at the moment of shock. One boy is said to have been pitched out of bed, and was found immediately afterwards with a hammer in his hand ready to attack someone whom he supposed to be concealed under the bed. Numbers of witnesses spoke of the feeling of giddiness or nausea that so frequently accompanies earth-movements. Dogs barked or howled to mark their sympathy in the general alarm. No damage of any kind, however, seems to have been done, unless under that name be included the dislodgment of a portion of the plaster from the ceiling of a church at Portobello.

The most violent motion appears to have been felt along the north-west base of the Pentland Hills and thence in a north-easterly direction through the northern parts of Edinburgh. There can be little doubt that the source of the shock lay somewhere along the line of these hills. We may plausibly connect it with the failure of support, and consequent fall, of some part of the rocks along one of the main lines of fault that define the chain of the Pentlands.

The greater frequency of earthquakes in the winter half of the year has often been remarked upon. It is certainly during that season that they most generally occur in Scotland. With regard to the shock of last week, we find that a strong gale had been blowing for some time, and that the barometer had fallen four-tenths of an inch between Thursday and Friday. The position of the moon, according to some seismologists, conduces to the determination of those disturbances of the terrestrial crust that give rise to earthquakes. With regard to the disturbance of the 18th instant it is noticeable that full moon happened the previous morning, when there was a lunar eclipse. It is about the time of new moon and the first quarter that the chief earthquake-maxima are said to take place.

A. G.

DECOMPOSITION OF NICKEL AND COBALT.

CHEMISTS have recently heard with great interest that Dr. Krüss, of Munich, a well known and trusted worker, has succeeded in "decomposing" nickel and cobalt. Judging from the accounts which thus far have reached us, it would appear that his discovery consists in finding that cobalt and nickel contain about 3 per cent. of a new element which is common to both as ordinarily prepared. By the removal of this hitherto unrecognized "impurity," the properties of the cobalt and nickel salts are slightly modified as to colour, &c. It is to be expected that the discovery will serve to explain the discrepancies which are to be noted among the various determinations of the atomic weight of nickel and cobalt. We give the following details from a short note upon the subject in the *Chemiker Zeitung* of January 27:—

Dr. Krüss, in conjunction with Herr Schmidt, read a paper at the meeting of the Munich Chemical Society of January 11, upon the results of their attempted redetermination of the atomic weights of these two metals. Clemens Zimmermann, as the outcome of a determination made some years ago, found the atomic weight of cobalt 58·74, and that of nickel 58·56. The method followed by Krüss and Schmidt was a revival of the older process of Winkler, and consisted in determining the relative equivalents of gold and nickel, and of gold and cobalt. Such a method ought now to be very much more trustworthy, on account of the recent exceptionally accurate determinations of the atomic weight of gold made simultaneously by Dr. Krüss himself, and by Prof. Thorpe and Mr. Laurie in this country. The process simply consisted in precipitating the gold from a neutral solution of gold chloride or sodium gold chloride by weighed quantities of metallic nickel or cobalt, chlorides of the two latter metals passing into solution. The results, however, were not what were expected, and differed among themselves to a remarkable extent. It was found impossible to precipitate the equivalent in gold of the nickel or cobalt employed, owing to the inverse effects of polarization, small quantities of metallic nickel or cobalt being reprecipitated, and thus mixed with the finely divided gold. In order to determine the amount of metal which had been dissolved, the precipitate was weighed, dissolved in aqua regia, and the gold reprecipitated by sulphurous acid. The weight of gold thus obtained, deducted from the weight of the whole precipitate, of course gave that of the admixed nickel or cobalt. Even after making this correction, the method afforded such surprisingly untrustworthy values that it became necessary to seek for the disturbing cause. On washing the reprecipitated gold, it was noticed that the red colour of the filtrate due to chloride of cobalt gradually paled, and eventually took a greenish tint. On evaporating a quantity to dryness and igniting in a platinum dish, the small residue obtained was found to dissolve in warm concentrated hydrochloric acid forming a beautiful green solution. On cooling, the liquid again became almost colourless, and gave a white precipitate of hydrate on addition of ammonia, which on ignition gave a white oxide; and a brownish-black precipitate of sulphide with ammonium sulphide. A number of other reactions also show that the compounds of this metal, which was itself obtained as a black powder by reduction of the oxide with charcoal, are not to be identified with those of any known element. The most interesting fact, however, is that the washings from the gold obtained in the nickel determinations gave precisely the same indications; the same residue on ignition, a green solution on treatment with warm hydrochloric acid, and the same hydrate and oxide. Several other methods were also described in the memoir, which we hope shortly to see published, by which this same common ingredient could be extracted from both nickel and cobalt. It is very interesting that Dr. Krüss has also obtained a green double chloride of the

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new metal and red cobalt chloride, which possesses all the properties of green nickel chloride, which has thus been decomposed into a red and a colourless salt.

NOTES.

THE Royal Society has recently entirely recast the regulations under which the Government fund of £4000 for the promotion of scientific research is administered.

MR. COMMON's 5-foot telescope is now completed, and photographs of the moon and nebulæ have already been taken to test the figure of the silver-on-glass speculum. We hear the results are quite satisfactory. Congress is to be asked to vote 250,000 dollars for the purchase of a refractor of the same dimensions for the Washington Observatory.

MR. ISAAC ROBERTS, working on the lines laid down by Mr. Common, has recently, by exposures of over four hours, obtained most important additions to our knowledge of the nebulæ of Orion, Andromeda, and the Pleiades.

WE believe that the Royal Astronomical Society has this year awarded its medal to M. Lœwy, of the Paris Observatory.

PROF. CORFIELD has been elected an Honorary Member, and Dr. Louis Parkes a Foreign Associate, of the Société Française d'Hygiène.

LAST week's number of the *Electrician* contains a notice of the work of Sir William Thomson, accompanied by an admirable steel engraving.

THE new Laboratory at the Normal School of Science, built for the accommodation of the students in the practical courses in physics and astronomical physics, is now finished. It accommodates about eighty students.

THE Medals and Funds to be given at the anniversary meeting of the Geological Society on February 15 have been awarded by the Council as follows: the Wollaston Medal to Prof. T. G. Bonney, D.Sc., F.R.S.; the Murchison Medal to Prof. James Geikie, F.R.S.; the Lyell Medal to Prof. W. Boyd Dawkins, F.R.S.; and the Bigsby Medal to Mr. J. J. Harris Teall; the balance of the Wollaston Fund to Mr. A. Smith Woodward, of the British Museum; that of the Murchison Fund to Mr. Grenville A. J. Cole, of the Science Schools, South Kensington; and that of the Lyell Fund to M. L. Dollo, of the Royal Museum at Brussels.

AT the last meeting of the Mineralogical Society, there was described a new mineral species, an oxychloride of lead, to which the name of "daviesite" was assigned. This mineral was found as very minute crystals in a specimen from Sierra Gorda in Bolivia. The crystals are very rich in faces, and belong to the ortho-rhombic system; their parametral ratios are $a : b : c = 1·2594 : 1 : 0·6018$; they are elongated in the direction of the vertical axis, parallel to which there are faces of the prism (110) and the pinacoid (100), and they are terminated sometimes by a simple basal plane (001), sometimes by the domes (011), (031), 101), (301), (501), and the pyramids (211), (121), (221), (521). The optic axes are visible when the basal plane is normal to the axis of the convergent polarized light.

THE Scientific Department of the Scotch Fishery Board, in view of the approaching great spawning period of the marine food-fishes, have begun a series of systematic investigations at some of the more important fishing-grounds lying off the east coast of Scotland. From a report presented to the Fishery Board by Prof. Ewart, it appears that one of the Board's naturalists (Mr. T. Scott) has recently made some interesting observations on board the large steam-trawler *Southesk*, of Montrose, as to the spawning of the plaice (*Pleuronectes platessa*) at Smith Bank, a well-known ground in 20 fathoms of water, lying off the Caithness coast, where operations were carried on for several days. A great variety of fish were obtained; but, except a few gurnards, only the plaice, which were present in great numbers, were spawning. Specimens both quite ripe and partly spent were captured by the trawl, while the tow-net revealed the presence of countless multitudes of floating eggs on the surface—in all stages of development—as many as 10,000 being obtained in one haul. These were shown to be almost entirely the ova of plaice, the remainder being the ova of the gurnard. Such an opportunity of witnessing the spawning of a shoal of flatfish on so gigantic a scale, and of proving so clearly the relationship between the spawning fish and the pelagic ova, does not often occur.

A BOTANICAL STATION was established early last year at St. Lucia on the most unpretentious footing. A Committee appointed to supervise the work of the Curator, Mr. John Gray, reports that, "considering the difficulties incidental to the starting of such an undertaking, the peculiar nature of the ground, and the limited funds available for the purpose, the work thus accomplished is satisfactory." The Committee says that the most encouraging feature of Mr. Gray's report is the general appreciation shown by the agriculturists of the district in the success of the Station, as shown by their increasing disposition to seek advice from the Curator, and to try and obtain seeds from him. Already the demand for cocoa, coffee, and nutmeg plants is so great that additional land will have to be acquired for the extension of the Garden.

LORD WOLSELEY, who is not often caught tripping in making hasty statements, writes as follows in the current number of the *Fortnightly Review*:—"The battles of the future will be very different from even those of 1870. . . . One remarkable change will be the absence of nearly all that terrific noise which the discharge of five or six hundred field guns, and the roar of musketry caused in all great battles. . . . The sound of cannon will be slight, and will no longer indicate to distant troops where their comrades are engaged, or the point on which they should consequently march. Our sentries and advanced posts can no longer alarm the main body upon the approach of the enemy by the discharge of their rifles. The camp or bivouac will no longer be disturbed at night by the spluttering fire of picquets in contact with the enemy. Different arrangements for giving the alarm upon the approach of hostile columns will have to be resorted to. The main column on the march cannot in future be warned, by the shots of flanking parties, of the enemy's proximity, and a battle might possibly be raging within a few miles of it without that fact becoming at once apparent." Will some competent member of the "Scientific Corps" kindly explain, or are they all in civil employ?

WE make the following extract from a letter addressed by Mr. A. W. Tuer to a contemporary:—"The melodious hum of skating was perhaps never heard to greater advantage than through the crisp air of a bitterly cold morning little more than a fortnight ago—the first Sunday in the year. Almost as soon as Kensington Gardens were entered, one became conscious of a clearly-defined musical sound coming from the direction of the Round Pond—G as nearly as I could judge, but corrected to G sharp, when, half an hour later, I got to a piano. I had wished to compare the notes—probably lower—given forth by other and larger sheets of ice, but procrastination strangled an opportunity which perhaps others will take when it again offers. Comparing a sheet of ice to a taut string, and the countless skates to the hairs of a bow—scientifically, a poor comparison enough—the sound might be expected to have been like that produced by the scraping of a fiddle, but it exactly resembled the whistle of a distant locomotive."

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